

CHAPTER 1

ROAD & CONSTRUCTION SITE PRACTICES

BMP 1-1	DEVELOPMENT SITE PLAN
BMP 1-2	GRADING SEASON & PRACTICES
BMP 1-3	ACCESS ROADS
BMP 1-4	DUST CONTROL
BMP 1-5	TOPSOIL MANAGEMENT

BMP 1-1 DEVELOPMENT SITE PLAN

DEFINITION

A site plan identifies the physical features of the site, the location of proposed development, and the location of temporary and/or permanent BMPs.

PURPOSE

The development site plan provides basic information about the physical characteristics of the site including: topography, access, surface water courses, etc.. By utilizing a development site plan the proposed development can be situated to minimize impact to natural resources, the land, and to enable water quality protection measures and runoff conveyance measures to be properly located.

APPLICABILITY

Site plans are required in a variety of situations, especially when development results in a land disturbance.

PLANNING CRITERIA

The first step in development site planning is to identify the physical features of the site.

1. Topography - A topographic map that shows the existing topography and site conditions at a scale appropriate to the project.
2. Drainage - The topographic map will help indicate which way water will flow across the site. On the map identify points where runoff will enter and leave the site. Mark all existing streams and drainageways on the map. Perform a drainage analysis for the site as it exists before development.
3. Vegetation - Show the existing locations of the trees and shrubs on the map.
4. Identify land capability boundaries, including boundaries of stream environment zones, flood plains, and other natural hazards.
5. Identify significant features such as rock outcrops, survey monuments, existing roads or other impervious coverage.

METHODS AND MATERIALS

After the physical features of the site have been identified, locate the proposed development in order to minimize land disturbance.

1. Minimize earth movement - Fit development to the terrain. Minimize cuts and fills.
2. Minimize impervious coverage - Make paved areas, such as driveways and parking pads consistent with other design and regulatory requirements.
3. Minimize vegetation removal - Preserve trees, grass, and other native vegetation in order to maintain site stability and reduce BMP costs. Locate structures and driveways to minimize the need for site clearing.
4. Avoid steep slopes - Confine construction activities to the least critical parts of the site. Once these areas are disturbed by construction, the resulting erosion may be very difficult to stop. In addition, any construction activities on steep slopes will require installation of costly BMPs.
5. Align roads and driveways along slope contours - Locate driveways parallel to slope contours rather than up and down slopes. Runoff down long or steep driveways tends to channelize flows and can cut deep gullies along the driveway.
6. Retain the natural drainage system - Avoid confining any natural drainage system by placing it in a buried culvert or forcing it to a new location on-site. Accommodate all drainages entering the site, whether natural or established by man.

After the proposed developments have been located, identify the erosion and sediment control measures (BMPs) to be installed both during and after construction.

MAINTENANCE

The development site plan should be updated and kept current based upon any physical changes to the site. Periodic reviews of the site plan should be conducted.

BMP 1-2 GRADING SEASON & PRACTICES

DEFINITION

The grading season is determined by the local climate conditions. All grading, clearing, and excavation work should be conducted during this period in order to avoid climatic conditions that could increase the chances for erosion.

PURPOSE

To coordinate grading and construction activities such that bare and disturbed soil exposure is minimized during the winter snow and rainy seasons.

APPLICABILITY

For construction or development projects which occur in a location where there is an opportunity for snow or rain to occur to the extent that soils become saturated and surface soil erosion is possible.

PLANNING CRITERIA

Many counties and communities have established specific grading and construction seasons applicable to their local environment. Coordination with the local building department or public works department will clarify any regulatory requirements applicable to the development project.

METHODS AND MATERIALS

The best time to begin construction is after the snow has melted. All grading and excavation work should be completed prior to the setting in of winter. At that time, all building sites should be winterized. Grading should not take place during storm events, rain or snow, and for the following period of time when the site is covered with snow or the soil is in a wet, saturated, muddy or unstable condition.

BMP 1-3 ACCESS ROADS

DEFINITION

Roads to provide needed access to an area should be constructed in such a way that the quality of runoff water is preserved.

PURPOSE

To provide a route for vehicle travel, for moving equipment, supplies and products, and for providing access for proper operation and management of conservation enterprises without disturbing the quality of runoff water.

APPLICABILITY

Where roads are needed to provide access from a county, state or federal highway or to provide planned travelways within an area.

PLANNING CRITERIA

1. **Location:** Roads should be located to serve the purpose intended and to facilitate the control and disposal of surface water.
2. **Gradient, Vertical and Horizontal Alignment:** The gradient and alignment should be adapted to the development of which it is a part.
3. **Width:** The recommended minimum width of the road bed is 14 feet for one-way traffic and 20 feet for two-way traffic. The tread width for two-way traffic should be increased approximately five feet for trailer traffic. The recommended minimum shoulder width is two feet on each side of the tread width. Widths less than recommended minimums may be used where topography or other natural conditions restrict the width.
4. **Side Slopes:** All cuts and fills should have side slopes that are stable for the soil or soil material involved. Typically side slopes should not be steeper than 2:1 (50% slope).
5. **Drainage:** Culverts, bridges, or grade dips should be provided at all natural drainageways. **Design of these structures should be conducted by a qualified engineer in keeping with sound engineering practices for the class of vehicle or equipment used on the road.**

Roadside ditches should be adequate to provide surface drainage for the roadway and deep enough to serve as outlets for subsurface drainage.

6. **Erosion Control Measures:** Erosion control measures should be provided for road ditches, cut slopes, fill slopes, and cross drains.
7. **Surfacing:** Access roads should be given a wearing course or surface treatment when required for traffic needs, climate, erosion control, or dust control. The type of treatment will depend on local conditions, available materials and the existing road base. Where these factors and the volume of traffic are not a problem, no special treatment of the surface is required. **Sound engineering practices must be followed to insure that the road will meet the requirements for its intended use.**
8. **Intersection with Public Highways:** Traffic safety should be a prime factor in selecting the angle of intersection with public highways. Any access roads that connect to a state highway must be approved by the State Highway Department.

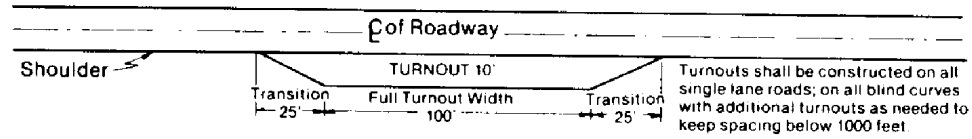
MAINTENANCE

Roadways, drainage structures and erosion control facilities must be maintained on an as needed basis given the site specifics of the access road to keep them operational. Proper and regular maintenance will minimize soil erosion and the degradation of surface and ground water resources.

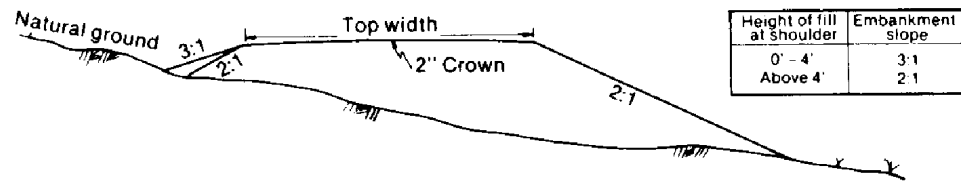
EFFECTIVENESS

Proper installation and maintenance of access roads can be effective in reducing soil erosion and minimizing impacts to water quality.

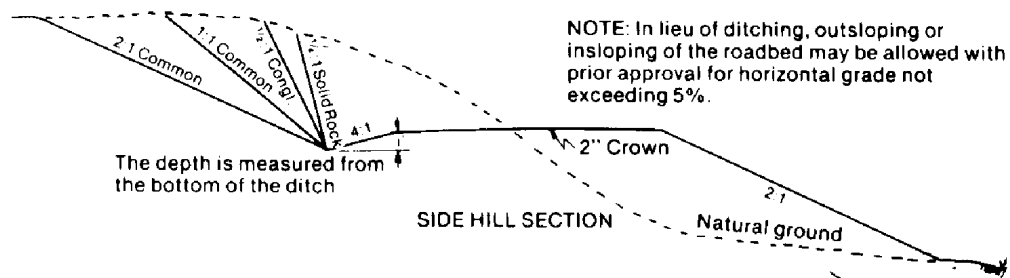
TYPICAL ACCESS ROAD CROSSECTIONS FIGURE 1-1



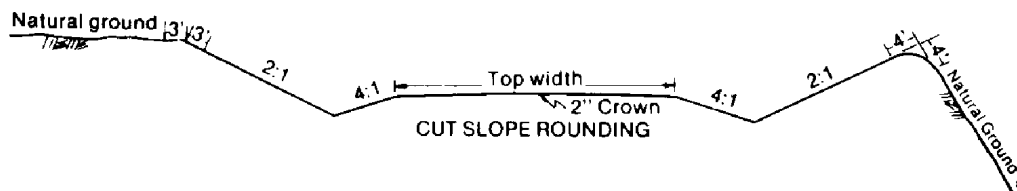
TYPICAL TURNOUT PLAN



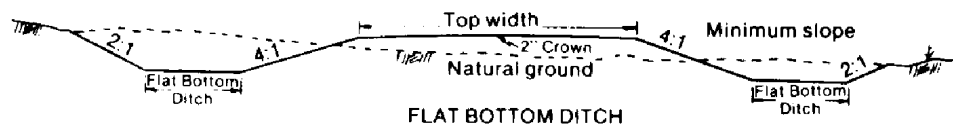
EMBANKMENT SECTION



SIDE HILL SECTION



CUT SLOPE ROUNDING



FLAT BOTTOM DITCH

BMP 1-4 DUST CONTROL

DEFINITION

The control of windblown soil or other materials to reduce dust.

PURPOSE

To prevent excess movement of soil or other materials by wind, to reduce on-site and off-site damage, and to reduce health and traffic hazards.

APPLICABILITY

This practice applies to open areas subject to wind erosion, including cropland, hay and pastureland, construction sites, surface disturbance areas such as mine sites, waste dumps and mill tailings, livestock concentration areas and similar sites.

PLANNING CRITERIA

1. In construction, mining and land development work, plan and schedule work to open the least amount of land possible at one time. Surface disturbances should be stabilized or reclaimed before additional land is disturbed.
2. Plan and install temporary erosion control measures during construction, mining or development operations.
3. Install permanent erosion control measures as soon as construction, mining or development work is completed.
4. For new agricultural lands, or surface disturbances the irrigation water supply should be developed before land is opened so that water is available for establishing crops or cover crops.
5. When possible, schedule farming, construction, mining and development operations during months with the least wind erosion hazard. This is usually during late summer through fall.

METHODS AND MATERIALS

1. Stone and gravel mulches can be used for stabilization of surface disturbances.
2. Irrigation - Irrigate as needed to keep the surface moist but not saturated for temporary control of dust.
3. Vegetative Cover - Establish cover using native and adapted plant species.
4. Barriers - Establish temporary and permanent barriers as nearly as possible at right angles to the prevailing winds. The barrier(s) should be located upwind of the site in the best location(s) to retard the majority of the prevailing winds. Depending upon the specifics of the site and wind behavior the number and height of wind barriers should be considered. Board fences, snow fences, burlap, plastic netting, bales of hay or straw or earth ridges can be used for barriers. Use hedges of tall grasses, or shrubs; or tree and shrub windbreaks for barriers (See BMP-3-5 Windbreaks).
5. Emergency Tillage - Tillage to roughen the soil surface can be used for temporary control. Tillage should be at right angle to prevailing winds and performed to leave a ridged, cloddy surface.

MAINTENANCE

Regular maintenance is critical to effective dust control, whether temporary or permanent measures are being utilized. Regular water applications are necessary given specific site conditions. Mulches should be replaced or reapplied as necessary. Vegetative cover should be established and maintained on surface disturbance areas. Keep windbreaks and barriers in good condition by repairing or replanting any openings. Protect sensitive areas from additional surface disturbance.

EFFECTIVENESS

Dust control will reduce sediment delivery by runoff waters, control degradation of water in nearby streams and lakes from windblown sediments and minimize the loss of topsoil.

BMP 1-5 TOPSOIL MANAGEMENT

DEFINITION

The salvaging, stockpiling and reapplication of topsoil or other selected materials to be used as growth medium in the reclamation of surface disturbances.

PURPOSE

To re-establish the stability and productivity of lands subject to surface disturbances through proper soils management.

APPLICABILITY

Proper topsoil or soils management is critical to successfully reclaiming surface disturbances resulting from agricultural, mining, construction or development activities. Surface disturbances of all sizes require that available topsoil or selected replacement material, which will be utilized for growth medium, be managed in a proper manner.

PLANNING CRITERIA

The following elements should be considered when developing a topsoil management plan for a specific project.

1. The amount and quality of existing topsoil or growth medium.
2. The amount of surface disturbance (area), which will receive topsoil or growth medium and the required depth of application.
3. Methodology to be utilized for topsoil or growth medium salvage.
4. Storage location, the duration of storage of salvaged soils and the protection of stockpiled soils to prevent erosion.
5. The feasibility of direct replacement of the salvaged soils.
6. Availability of additional growth media to supplement topsoil replacement.

METHODS AND MATERIALS

1. **Conduct a site specific soil survey of the project area as a part of baseline investigations.** The soil survey will identify the soils suitable for salvaging, their depth and amount prior to disturbance.
2. All suitable topsoil and suitable material to be utilized in reclamation of the surface disturbance should be salvaged wherever feasible and stockpiled for reapplication.
3. If conditions permit, or if project schedules can accommodate, topsoil or growth medium should be applied directly to recontoured disturbance areas.
4. Stockpiled soils should be properly stored and revegetated to protect from erosion. Long term storage of soils may result in the loss of vital organisms within the soil, thus jeopardizing revegetation or landscaping success.
5. Soil replacement depths are determined by several factors including: pre-disturbance soil depths, vegetation types and the physical and chemical properties of the material being covered. Generally speaking, the poorer the physical and chemical properties of the spoil or waste material the greater the required depth of replacement soil. Soil testing, (nutrients, pH and toxicity factors), of the replacement soils and the materials to be covered should be completed prior to reapplication.

MAINTENANCE

Topsoil stockpiles require periodic maintenance to prevent erosion. Based upon the anticipated length of time the soils will be stockpiled, the piles should be covered with plastic or another substrate to protect from wind, rain and erosion. If storage will be for a long period of time, the stockpiles should be seeded with either annual or perennial grasses. This will stabilize the stockpiles surface. Other mechanisms may include covering stockpiles with plastic or canvas tarps or rock mulches.

EFFECTIVENESS

Proper topsoil management will result in successful revegetation of surface disturbances, reduce soil erosion, and initiate the restoration of the surface disturbance areas stability and productivity.